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The Contribution of Drawing Strategies to the Comprehension of a Scientific Text in High School Students

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Abstract

Drawing, as a learning strategy, sharpens a student's observational skills, facilitates accurate and consistent notation of central elements in the text, develops critical thinking, reinforces memory and understanding, adequately encodes large amounts of information, and triggers a web of associations (integration of new understanding with existing ones) (Ridley and Rogers, 2010). Furthermore, to summarize by drawing requires the student to employ selection, organization and integration, which strengthen the prerequisite cognitive processes for meaningful learning (Gobert & Clement, 1999; Hall et al., 1997; Mayer, Steinhoff, Bower & Mars, 1995).

The current study examines two key questions. First, to what degree does drawing actually contribute to the understanding of scientific texts? And second, of the various drawing methods employed in the study, which method best contributes to understanding those texts?

The study comprised 159 ninth grade students living in the central region in Israel, who were allocated to five study groups, which met for two sessions. In the first session, students were asked to fill a personal information questionnaire and to answer a multiple-choice test that tested prior knowledge of protein structure. In the second session students read a passage on protein structure (which in some groups included an illustration) and were asked to summarize the text. In addition to the written summary, two groups were asked to draw freely, whereas a third was asked to use tracing paper to copy the illustration in the text. At the end of the second session, students retook the test administered in the first session.

Controlling for age and gender, students who read the unillustrated passage and were asked to draw freely showed significantly greater improvement on average than

students who read the same passage but were not asked to draw and greater improvement than students who read the illustrated passage and were asked to copy the illustration. Furthermore, among students who were not asked to draw, those who read the illustrated passage showed greater improvement than those who read the unillustrated passage.